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LACTIC ACID BACTERIA IN THE FOOD INDUSTRY

1. Fermented food

Certain strains of probiotics, such as *Lactobacillus*, *Leuconostoc*, and *Enterococcus*, have the ability to thrive and remain viable throughout the fermentation process. These beneficial bacteria are commonly found in a variety of fermented foods, including yogurt, sauerkraut, kimchi, and kefir. LAB commonly found in fermented foods include *Lactobacillus*, *Leuconostoc* and *Enterococcus*, *Weissella*, *Pediococcus*, etc. ICBs are indeed involved in the production of a wide range of fermented food products, including alcoholic beverages, fermented bread and noodles, fermented fish and meat, fermented milk products and fermented vegetables (Abdul Hakim BN, Xuan NJ, Oslan SNH. A Comprehensive Review of Bioactive Compounds from Lactic Acid Bacteria: Potential Functions as Functional Food in Dietetics and the Food Industry. *Foods*. 2023; 12(15):2850.). During the fermentation of sourdough bread, the joint use of lactic acid bacteria (*Lactiplantibacillus plantarum*, *Lactiplantibacillus plantarum*, *Furfurilactobacillus rossiae* and *Lacticaseibacillus casei*) and yeast produces compounds associated with the sour aromas of bread and contributes to the aromatic characteristics of bread. Some *Lactobacillus* strains, such as *Lentilactobacillus buchneri*, *Limosilactobacillus reuteri*, *Limosilactobacillus fermentum* and *Levilactobacillus brevis*, can convert 2-acetolactate to acetoin, involved in flavor formation in Zhenjiang aromatic vinegar (Wang, Y., Wu, J., Lv, M., Shao, Z., Hungwe, M., Wang, J., Bai, X., Xie, J., Wang, Y., & Geng, W. (2021). Metabolism characteristics of lactic acid bacteria and the

expanding applications in food industry. *Frontiers in Bioengineering and Biotechnology*, 9. <https://doi.org/10.3389/fbioe.2021.612285>)

Lactobacillus plantarum is commonly found in fermented vegetables due to its resistance to acid and salt under specific fermentation conditions. Fish that was often fermented contained *L. plantarum*, making it safe to eat. Commercial yogurt contains live cultures such as *Lactobacillus delbrueckii* subsp. *bulgaricus*, which are added during production to create a unique texture, taste and nutritional value (Abdul Hakim et. al., 2023). Lactic acid bacteria have the ability to degrade phytic acid, which affects the taste of food and is difficult to digest. For example, in the fermentation process of yam-based products, phytase produced by *Leuconostoc lactis* CCMA 0415, *Lactiplantibacillus plantarum* CCMA 0744 and *Limosilactobacillus fermentum* CCMA 0745 can degrade phytic acid. *Lactobacillus helveticus* can be used as an auxiliary starter for the hydrolysis of bitter peptides in cheese production (4).

2. Vitamins

L. plantarum showed the highest folic acid production compared to other LAB. Additionally, *Lactococcus lactis* and *Streptococcus thermophilus* are common LAB used as starter in yogurt production due to their folate synthesizing capabilities (Abdul Hakim et. al., 2023).

3. Preservation of food products

LAB *L. lactis*, in addition to demonstrating antimicrobial activity against *L. monocytogenes* and *S. aureus* in Quark-type cheese, also demonstrated an effect on filamentous fungi and yeasts from spontaneous growth during 21 days of product storage. Zhao et al. confirmed that compounds produced by *L. plantarum* are able to inhibit *Aspergillus Niger*, *Aspergillus oryzae*, *Trichoderma longibrachiatum*, *Aspergillus flavus* and *Fusarium graminearum*. In another study by Guimarães et al.,

compounds produced by *L. plantarum* and *Lactobacillus buchneri* were able to prevent the growth of *Penicillium nordicum* as well as the production of ochratoxin (Souza, LV, Martins, E., Moreira, IMFB, & De Carvalho, AF (2022). Strategies for the development of bioprotective cultures in food preservation. *International Journal of Microbiology (Print)*, 2022, 1–16. <https://doi.org/10.1155/2022/6264170>.)

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